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ABSTRACT

This paper describes the creation of a comprehensive evaluation tool for reference librarians in adult service divisions to use in selecting World Wide Web sites as reference sources. Traditional evaluation criteria, endorsed and applied by librarians over the years, are not sufficient for the evaluation of today's hypermedia web site environment. An effective tool must incorporate criteria from the discipline of library and information science, and also from the disciplines of graphic design and linguistics. This study identifies, defines, and discusses the characteristics of a valuable web site. A series of evaluation forms organize and display critical criteria taken from the current literature using the methodologies of content analysis and feature analysis. Prototype testing was conducted on a selective sample of 30 Internet web sites. Modifications and refinements were made to the instrument and incorporated into an accompanying user's manual. This manual defines and discusses the benchmark criteria and explains proper implementation of the instrument in any adult reference setting. No single element such as graphics, content, or user interface determines the quality of an Internet web site. The evaluation instrument affords reviewers the opportunity to examine multimedia, content, and user-interface while providing a quantitative means of rating each respective section. The instrument was created to evaluate individual web sites, not search engines or catalog sites. Appendices comprising half the document consist of the evaluation instrument and User's Guide. (Contains 29 references.) (Author/SWC)

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AN EVALUATION INSTRUMENT FOR INTERNET WEB SITES

A Master's Research Paper submitted to the
Kent State University School of Library Science
in partial fulfillment of the requirements
for the degree Master of Library Science

by

Stephanie Plank Livengood

July, 1997

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ABSTRACT

The purpose of this research project was to develop a comprehensive evaluation tool for reference librarians in adult service divisions to use in selecting World Wide Web sites as reference sources. Search engine and catalog sites are not included. Traditional evaluation criteria, endorsed and applied by librarians over the years, are not sufficient for the evaluation of today's hypermedia web site environment. An effective tool must incorporate criteria, not only from the discipline of library and information science, but also from the disciplines of graphic design and linguistics. Therefore, this study identified, defined, and discussed the characteristics of a valuable web site. The end product, a series of evaluation forms, organizes and displays critical criteria taken from the current literature using the methodologies of content analysis and feature analysis. Prototype testing was conducted on a selective sample of thirty Internet web sites. Modifications and refinements were made to the instrument and incorporated into an accompanying manual entitled "User's Guide." This guide defines and discusses the benchmark criteria and explains proper implementation of the instrument in any adult reference setting.

Master's Research Paper by

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CHAPTER I

INTRODUCTION

Electronic access to information is undoubtedly changing the way reference librarians find, select, and disseminate information. An example of this is seen in the vast number of sources on the Internet which are made accessible via the World Wide Web (WWW). The most recent figures exemplifying the exponential growth rate of the Internet are mind-boggling. The total number of registered sites as of 1997 has reached the staggering figure of 9.4 million, and the number of individual web pages is estimated to be somewhere between thirty and fifty million.[1] One explanation for these extremely high figures is the ease of use, standardization, and portability of hypertext markup language, HTML, which allows practically anyone to create web pages and web sites.

Internet web sites present reference librarians with a multitude of unprecedented challenges. They are yet another source with which librarians must be familiar and consider for an information retrieval process. Their placement within the Internet can be described as chaotic - a characteristic in stark contrast to the typical libraries in which order and organization serve as the fundamental keystone. The quality of information on World Wide Web sites varies tremendously; some sites are excellent while others are extremely poor. Finally, the increasing complexity requires that they be put through the rigors of an evaluation and review process before they can ever be selected as reference sources.

Today's reference librarians and information scientists are in the prime position to embrace these challenges and, at the same time, to advance the profession. As the Internet becomes more commonplace in the American home, the knowledge and skills of librarians in information acquisition, selection, and evaluation will become even more valuable. Internet users will need to know how to use complex search engines and indexing systems present at web sites. More importantly, as the number of sites increases and sources overlap with one another, users will need to know which sites to access for quality information.

Reference service is indeed entering a new era as librarians prepare to provide a more sophisticated electronic reference service in the next century. An Internet reference and review service will be necessary to meet the swiftly changing needs of patrons. The basis of such a program is indeed nothing new to libraries. They have been offering a similar service to patrons for many years who have come to trust and rely on their recommendations for print, audio, and video materials. An Internet reference and review program will require much time and funding, although the service should be regarded as a sound investment of public monies in the future.

At present, librarians currently have only two options from which to choose in locating quality reviews of academic and general reference web sites. They may consult any of the four evaluating services provided by library and information scientists listed below, or they may perform their own individual evaluations and reviews. The first source, College & Research Libraries News, publishes a monthly column entitled "Internet Reviews," edited by Sara Amato of Central Washington University. She critiques three or four sites each month that are most appropriate to the college library setting. Also, the official publication

of the American Library Association, Library Journal, contains a monthly column entitled "Web Watch" by Boyd Collins. He evaluates three or four sites per month which would be appropriate to public libraries. A third reviewing source, the official web site of the H.W. Wilson Company, http://www.hwwilson.com, offers a column, "Rettig on Reference," by James Rettig of William and Mary College. Each month he discusses and reviews a variety of Internet resources, including several World Wide Web sites. The final reviewing service, the Infofilter Project, is a group effort by library and information scientists nationwide to provide in-depth description, evaluation, and review of web sites. The Project is accessible through the University of Southern California's web site at http://www.usc.edu/users/help/flick/Infofilter/. This professional group has reviewed approximately forty-two web sites to date.[2]

The total number of reviews published by these four evaluating services amounts to less than one hundred. This distressing figure alone is reason enough for librarians to conduct their own evaluations and reviews, not to mention the fact that librarians do indeed have their own valuable reviewing skills to offer. A reference and review service not only would benefit patrons, but also would be an additional public resource the library could offer with confidence and understanding. Furthermore, if librarians are to be experts at managing Internet information, as they are at other information sources, they must now take the lead in the evaluation and review process of Internet web sites.

A review of the literature reveals a significant number of electronic publications on the topic, "Evaluating Internet Resources." Contributing authors are confronting this issue head on. The primary theme throughout these articles is the call for the application of critical

thinking to the evaluation process of Internet information. The major difference of opinion among the authors is their proposed methodology for the implementation of this process. An example of a technology-based approach is proposed by Matthew T. Ciolek of the Australian National University, Canberra. He calls for an evaluative procedure that is "...simple, ... automated, ... and carried out by a piece of software."[3] On the other hand, Louis B. Rosenfeld, instructor of Library and Information Science at the University of Michigan, contends that "... no automated tool can assess the quality of information resources on the Internet; intrinsic issues of format, content, context, source, location, authority, cannot be judged by software. Instead, quality assessment continues to be almost wholly the product of intellectual labor."[4]

The purpose of this research project was to develop such an intellectual tool for adult service reference librarians to use in selecting Internet web sites as reference sources. Search engines and catalog sites are not included because of time and complexity constraints. Traditional evaluation criteria, endorsed and applied by librarians over the years, are not sufficient for the evaluation of today's hypermedia web site environment. An effective, evaluation instrument must incorporate a taxonomy based on criteria taken not only from the discipline of library and information science, but also from the disciplines of graphic design and linguistics, among others.

Development of this instrument was accomplished in four phases. Part I focused on the identification, definition, and discussion of web site evaluation criteria taken from current literature in the above-mentioned disciplines. The second part of the study involved transposing these criteria onto a series of evaluation forms as presented in Appendix A. In

Part III of the study, the prototype was tested on thirty web sites. Quantitative and qualitative data documenting the tool's effectiveness were compiled and reported in Chapter 5 entitled "Analysis of Data." The study came to fruition in Part IV, the follow-up phase, during which modification and refinement were made to the instrument. Final commentary regarding the worthiness of this study was included in Chapter 6 entitled "Summary and Conclusions."

The extensive number of evaluation criteria revealed in the literature review posed one of the main limitations of the study. For reasons relating to the functionality of the instrument, the researcher selected criteria based on importance, relevance, practicality, and testability. A second limitation, the restricted time frame of this project, required placing a ceiling on the sample size, making it seem minute in comparison to the vast number of web sites comprising the study's population.

CHAPTER II

REVIEW OF THE LITERATURE

A literature review on the topic "Evaluating Internet Information" revealed relevant and timely materials published since 1993 in the form of monographs, journal articles, and electronic publications. The initial search for monographs was performed on the OHIOLINK and CLEVENET online library catalogs using the following subject and word search strings: "Internet and Librar* and "Internet and Evaluat*." This same search strategy was repeated substituting the term World Wide Web and the acronym, "WWW," for "Internet." Results of these searches were successful in locating materials providing a broad overview of the topic. Two comprehensive Internet guides, consulted during the research phase of this project, were the World Wide Web 1996 Unleashed by authors, John December and Neil Randall, and The Whole Internet by Ed Krol. A third ancillary source, Librarians on the Internet, edited by Robin Kinder, served as a reference source for Internet service issues currently being addressed by library and information scientists.

Additional subject searching for monographs was conducted using the search string, "web site and design." This search revealed numerous publications applicable to all sections of the instrument, specifically Part II, the Multimedia Feature Analysis. The monographs retrieved were: Designing Large-Scale Web Sites by Darrell Sand, World Wide Web Design Guide by Stephen Wilson, and Building the Service-Based Library Web Site by

Kristen L. Garlock and Sherry Piontek. The first two publications, written by professional graphic artists, provided extensive detail on web site design techniques recognized throughout the industry for the presentation of text, graphics, audio and video. These guidelines served as a model upon which the benchmark criteria and evaluation questions were based. Also, these monographs contained definitions of technical terms pertinent to this study that were condensed and incorporated into the glossaries found in Appendix B. The latter publication, Building the Service-Based Library Web Site, included many of the key design elements cited in the above-mentioned graphic design books, and offered additional ideas based on the authors' experience and expertise as librarians. Some of their most useful suggestions incorporated into this study focused on content, accuracy, objectivity, and design techniques to benefit the disabled.

A third group of monographs critical to the human computer interaction and user interface issues addressed in this study were: Human-Computer Interaction by professors Alan Dix, Janet Finlay, Gregory Abowd, and Russell Beale; Principles and Guidelines in Software User Interface Design by Deborah J. Mayhew; and Evaluating Usability of Human-Computer Interfaces by Susannah Ravden and Graham Johnson. The textbook, Human Computer Interaction, provided essential background information on this discipline, commonly referred to as HCI, and offered substantial detail regarding input-output channels, e.g., vision, hearing, and touch, through which humans are capable of interacting with computers. Chapter 15, entitled "Multi-sensory Systems," addressed specific complexities unique to the dynamic Internet environment and many of the challenges it presents to both designers and users. Each chapter concluded with a "Recommended Reading" section which

led to several other publications cited in the bibliography to this research. The other publications by Mayhew and Ravden and Johnson, were most helpful in preparing the user-interface questions of Part IV and some multimedia questions in Part II. Their scientifically tested criteria and evaluation questions were adapted for incorporation in this tool.

A literature search of journal articles published since 1993 was accomplished by using Library Literature and the CONSORT Library Journal Index at the College of Wooster. Relevant articles on the subjects "Evaluating Internet Resources" and "World Wide Web Evaluation" were located in leading library and information science journals such as: Computers in Libraries, Library Journal, Reference Services Review, Online, and Internet World. The most substantive and useful articles retrieved were "Beyond 'Cool,': Analog Models for Reviewing Digital Resources," and "Putting the Squeezed on the Information Firehose: the Need for Neteditors and Netreviewers" by James Rettig . These two essays not only supported the development of a comprehensive web site evaluation instrument for librarians, but also listed specific reviewing criteria for Internet publications. Another journal article that aided in determining categorical headings for these criteria was "Web Watch" published in Library Journal on February 1st, 1996. In this premier column, Boyd Collins revealed his original taxonomy for the evaluation of web sites and described some accompanying criteria.

The most abundant source of information on this topic was found on the Internet itself. A simple boolean search combining the terms, "Internet and Evaluation," at the Lycos site revealed several bibliographies on the subject. The most exhaustive list has been compiled by Nicole Auer, a Library Instruction Coordinator at the Virginia Polytechnic

Institute and State University. The address of this web site is: http://refserver.lib.vt.edu/libinst/critTHINK.HTM.

Auer cites over twenty-five Internet publications, thirty print sources, and eight professional listservs, created by librarians, information scientists, and researchers. Of these Internet articles, approximately twenty were reviewed and analyzed for the purpose of this research. Those which served as a base for this project included: "Review of the Five Traditional Print Evaluation Criteria" by Jan Alexander and Marsha Tate; "Thinking Critically about World Wide Web Resources" by Esther Grassian; "Evaluation of Information" by Lisa Janicke Hinchliffe; "Library Selection Criteria for WWW Resources" by Carolyn Caywood; "Evaluating Quality on the Net" by Hope N. Tillman; and "Criteria for Evaluation of Internet Information Resources" by Alastair Smith.

Many of these authors re-examined traditional print evaluation criteria taken from authoritative sources such as Selection and Evaluation of Reference Sources by Bopp and Smith and "Evaluating Reference Books in Theory and Practice" by Norman Stevens, and discussed their applicability to the digital medium. All concurred that the majority of these criteria were indeed still appropriate, but would, however, require some modification and adaptation. Authors Grassian, Caywood, and Smith proposed additional criteria for links, structure, access, and multimedia design. Although these areas were neither discussed at great length nor described in terms more precise than those such as "user friendliness" and "workability," they were extremely useful in serving as a general outline for the instrument's design.

CHAPTER III

RESEARCH OBJECTIVES

The primary objective of this library science research project was to develop a comprehensive, evaluation instrument for adult service reference librarians to use in selecting Internet web sites as reference sources (search engine and catalog sites not included). In order to design a tool that would address the revolutionary technological advancements in today's hypermedia web site environment, the disciplines of library and information science, computer graphic design, and linguistics were examined to determine the most appropriate evaluation and review criteria.

The secondary objective of this project was to develop a tool that was pragmatic and easy to use in any library setting. This goal was accomplished by devising a consistent, concise format and arrangement. The instrument was divided into four distinctive sections which were further divided into subdivisions and arranged by their respective features and criteria type. The main elements included in the Multimedia Feature Analysis were graphics, video, animation, and audio. The purpose of identifying and examining these features was to determine whether or not they enhanced the information content of the site and if so, to determine the manner by which this was achieved. Library science and linguistics criteria included in the Content Analysis and Evaluation section were scope, authority, accuracy, objectivity, organization, and relation to other works. Accompanying evaluation questions

in this section focused attention on issues related to quality of the content. The final section, User Interface Evaluation, included criteria for navigation, searching, visual clarity, and informative feedback and support. By identifying and evaluating these features, the reviewer was better able to understand how information is accessed and whether or not it is easy to retrieve.

The third objective, to identify and define the characteristics of a valuable web site, was met by developing an instruction manual or "User's Guide" to be used in concert with the instrument. (See Appendix B) The primary purpose of this guide is to explain proper implementation of the tool. Definitions of criteria, a discussion of their significance, plus suggestions for locating these criteria within the web site are included, also.

The final objective, to render a tool that was efficacious in yielding desired results, was achieved by testing the instrument on a total of thirty Internet sites. Results in the form of quantitative and qualitative data exposed strengths and weaknesses of the tool. Modifications and adjustments were made in the final phase of this research to produce an end product consisting of a qualitative review in the form of a written recommendation to accept or reject the web site and a quantitative analysis or numerical rating to be used in support of the evaluator's approval or rejection of the web site. The final version of this instrument is found in Appendix A.

CHAPTER IV

METHODOLOGY

Development of the web site evaluation instrument was accomplished by using the four-part study described below: Part I - Research Phase; Part II - Design Phase; Part III - Testing Phase; and Part IV - Data Analysis Phase. Part I, the Research Phase, entailed the identification, definition, and discussion of valuable web site characteristics revealed through the literature review. The most critical of these were selected as benchmark criteria based on importance, relevance, practicality, and testability.

During the Design Phase, Part II, the criteria were transposed onto evaluation forms which served as the instrument for gathering data. The instrument was divided into four main parts preceded by an introductory cover sheet. These main sections were entitled: Part I - Technical Description; Part II - Multimedia Feature Analysis; Part III - Content Analysis and Evaluation; and Part IV - User Interface Evaluation. Content analysis and feature analysis methodologies were employed to allow the reviewer to work through the evaluation forms methodically and efficiently. The amount of time to complete a single evaluation was originally estimated to be twenty minutes. Results of the testing phase, however, indicated a mean time frame of 37 minutes.

The sequence of the instrument's individual sections was purposely devised to allow the reviewer full benefit from the review session. For example, upon first accessing a web

site, the reviewer should record the descriptive information presented at the homepage of the site in Part I. During Part II, the Multimedia Feature Analysis, the reviewer would be afforded the opportunity to become familiar with the site simply by maneuvering throughout to indicate the presence or absence of features, e.g., external and / or internal audio clips, black and / or white graphics, and continuous and / or user-activated animation. By Part III, Content Analysis and Evaluation, the reviewer should now be prepared to answer specific questions regarding content. It was anticipated that by concluding with Part IV, the reviewer, having already spent at least fifteen to twenty minutes navigating the site, would be able to answer questions regarding navigation, visual clarity, and informative feedback more efficiently.

Part III of this study, the Testing Phase, took place over an eleven day period from July 1st through July 11th, 1997. During this time, the prototype was tested on a total of thirty Internet web sites. A variety of sites comprising the selective sample was chosen based upon their potential as reference sources for a public library setting. The sites were selected from the publications PC Novice Guide to Web Sites, Web Site Source Book, and The Whole Internet. Testing was conducted by the author of this study on an IBM compatible computer system configured with the following hardware and software components: IBM/CYRIX 200+MHZ Processor, 256k Cache, 16MB Ram; 2.5 GB, IDE Western Digital Hard Drive; Trident 9680, PCI SVGA Card, 2MB, MPEG Video Card; Ensoniq PCI, 3D, 32 BitWave Audio Card with 60W Speakers; USRobotics Sportster External Modem, 33.6 bps, V.Fast; Compaq Presario 14" SV Color Monitor; 3 Button Saturn Mouse; 104 Key-Enhanced Keyboard; Microsoft Windows 95 Operating System; and Netscape Navigator Browser 3.0.

This system was the only one used for the purposes of this study.

The Data Analysis Phase, Part IV, took place July 11th through July 15th. Qualitative and quantitative results were analyzed and reported in Chapter V entitled Analysis of Data. Descriptive data was reviewed to ascertain the overall strengths and weaknesses of the instrument as well as its effectiveness in yielding desired results. Particular attention was given to the amount of time required to complete each evaluation and each individual section in order to determine whether the process required too little or too much time. The quantitative rating system was evaluated to determine whether or not it effectively served its intended dual purpose i.e., to provide a meaningful numerical rating for each individual site and to aid in distinguishing quality among sites with similar content. Finally, based on the results of the post-testing phase, modification and refinement were made to the tool to render it functional and effective.

Several limitations of this study were beyond the control of the researcher. The most imposing of these were the vast number of Internet web sites comprising the study's population and the constantly changing Internet environment. It was possible for an individual site to have been examined and evaluated on a given date only to be revised, updated, or changed completely the next day.

CHAPTER V

ANALYSIS OF DATA

Testing of the instrument took place as projected from July 1st through July 11th. During this time, a total of eighteen hours was spent evaluating the thirty pre-selected web sites listed below along with the URL, rating, and evaluation time in minutes. Quantitative and qualitative data generated during the testing phase exposed both strengths and weaknesses of the instrument.

WEB SITE	URL	RATING	MINUTES
1. AARP WebPlace	http://www.aarp.org	27	25
2. American Cancer Society	http://www.cancer.org	29	25
3. American Civil War Homepage	http://funnelweb.utcc.utk.edu/~hoemann/warweb.html	27.5	30
4. Art Institute of Chicago	http://www.artic.edu/aic/firstpage.html	29	25
5. Bartlett's Familiar Quotations	http://www.columbia.edu/acis/bartleby/bartlett	27	30
6. Brittanica Online	http://www.eb.com	29	45
7. Car and Driver	http.//www.caranddriver.com	29.5	30
8. CIA	http://www.odci.gov/cia	30	40
9. Consumer Information Center	http://www.gsa.gov/staff/pa/cic	27.5	40
10. Dow Jones	http://bis.dowjones.com	27	40
11. Emily Dickinson Page	http://lal.cs.byu.edu/people/black/dickinson.html	22	35

WEB SITE	URL	RATING	MINUTES
12. Fodor's	http://www.fodors.com	27	45
13. The Geneology Home Page	http://www.genhomepage.com	21.5	30
14. How Far Is It?	http://www.indo.com/distance	18.5	40
15. Major League Baseball	http://www.majorleaguebaseball.com	24	55
16. Mennolink -Mennonite Information Center	http://www.prairienet.org/community/religion/mennonite/menno.html	25	25
17. Merriam-Webster Online	http://www.m-w.com/dictionary	29	35
18. Mutual Funds Home Page	http.//www.fundsinteractive.com	23	25
19. NASA	http://www.nasa.gov	29	35
20. NBA	http://www.nba.com	29	20
21. Parenthood Web	http://www.parenthoodweb.com	27	30
22. PC Webopaedia	http.//www.pcwebopaedia.com	27	45
23. Peterson's Education Center	http://www.petersons.com	29	45
24. RxList Drug Index	http://www.rxlist.com	23	35
25. Social Security Office	http://www.ssa.gov/SSA_Home.html	30	50
26. Test PREP	http://www.testprep.com	25.5	45
27. USA Today	http://www.usatoday.com	29	45
28. Virtual Hospital	http://vh.radiology.uiowa.edu	29.5	60
29. Weather. Com	http://www.weather.com	29	35
30. White House	http://www.whitehouse.gov	30	40
	TOTALS	809.5	1,105

Statistical analysis of the data shed light on the overall functionality of the tool and effectiveness of the rating system. Measures of central tendency and dispersion relevant to this study were mean, mode, and range. The mean calculated for web site ratings was 27, and the mean for the number of minutes required to complete an evaluation was 37. This latter figure was broken down even further to determine the amount of time required to complete each individual section of the instrument. These results were as follows: Part I - Technical Description: 9 minutes; Part II - Multimedia Feature Analysis: 10 minutes; Part III - Content Analysis and Evaluation: 12 minutes; and Part IV - User Interface Evaluation: 6 minutes.

Mode was calculated for both the "Rating" distribution and the "Minute" distribution. These figures revealed that the most frequently assigned rating to a web site was 29 and that the most frequently occurring time period spent evaluating web sites was 45 minutes. A final statistic generated from the "Rating" distribution was that of range calculated at 11.5. Although this statistic is not extremely important, it may serve as a type of "alerting signal" for the individual reviewer. If in the future, for instance, ranges of web site scores were consistently wide, this may indicate that the evaluator should be more attentive to the initial web sites being selected for evaluation.

Of the above-mentioned statistics, the most anticipated and significant was the average amount of time required to complete a single evaluation. The reported 37 minutes was almost twice that of the original projection estimated to be twenty minutes. After examining the time averages for each individual section, it did not appear that these numbers were skewed. In fact, these time frames corresponded with the length and amount of detail in each section. Part III - Content Analysis and Evaluation was the most extensive section

requiring an average of 12 minutes to complete followed by Part II - Multimedia Feature Analysis which required 10 minutes. Part I - Technical Description required 9 minutes and Part IV - User Interface Evaluation required 6 minutes. The fact that the review process lasted longer than projected was merely a moot point since the instrument was successful in producing desired results within what may still be considered a reasonable time frame.

The rating system proved to be an efficient, effective means of representing data collected in each part of the instrument. The calculation table located on the cover sheet was especially helpful in bringing together all of the individual scores and then generating a final composite rating. The system performed extremely well in accomplishing its original two goals: to provide a quantitative indicator of quality and to serve as a means of justification for qualitative data.

During the Data Analysis Phase, it became apparent that two entirely new questions relevant to the categories "Searching" and "Informative Feedback/Support" would enhance Part IV - User Interface. These questions, incorporated into the final version of the instrument were: "Is an FAQ section present at the site?" and "Does the search facility contain a "Help" feature?".

In conclusion, it is important to bear in mind that further implementation of this instrument in various library settings will bear different results and that these findings serve only as guidelines. There are a myriad of factors beyond the control of the evaluator which impact the review process and affect the final outcome. Some of these factors are: type of computer hardware and software, particularly the platform and browser; quality of service of the Internet Service Provider; type of phone cables in a given area; various skill levels of

reviewers; complexity of web sites; size of web sites; and extent of detail at a site.

CHAPTER VI

SUMMARY AND CONCLUSIONS

As technology continues to grow and the number of web sites continues to increase, librarians must establish a system and be armed with the proper tools in order to manage the ever-increasing quantity of Internet information and to meet the continuing demand for identifying quality sources. Until now, there has been no comprehensive evaluation instrument to fulfill this critical need. Consequently, the development of a web site evaluation instrument for adult service librarians was executed as part of the Library and Information Science Master's Research Program at Kent State University over a three month period from April 15, 1997 to July 15, 1997.

The objectives of this research project were met by examining the disciplines of library and information science, computer graphic design, and linguistics to determine the most appropriate, up-to-date evaluation criteria. Ideas and findings of authorities in these fields were identified and analyzed to determine applicability to this study. Traditional print evaluation criteria and their application to the digital medium, discussed by authors Grassian, Caywood, Tillman, Brandt, Smith, Tate, and Alexander, played a major role in the design of the tool. These criteria were modified and combined with graphic design criteria and linguistic criteria to form a four-part practical tool.

If in the future this instrument is implemented in the context of an Internet reference

and review program, librarians should keep in mind that there are many criteria to be considered when determining the quality of an Internet web site. No single element alone such as graphics, content, or user interface determines quality regardless of the fact that some are more important than others. All must be taken into consideration, evaluated, and placed in proper perspective to make a thorough, objective assessment of the value and quality of a site.

The evaluation instrument was designed with this specific aim in mind, i.e., affording reviewers the opportunity to examine multimedia, content, and user-interface while at the same time providing a quantitative means of rating each respective section. If librarians choose to alter the rating system, they may do so by changing the weight of the multipliers or by readjusting the rating scale. The tool is flexible and adaptable to any library setting. Finally, the instrument was conceived for the sole purpose of evaluating individual web sites, not search engines or catalog sites. This model can now serve as a basis for further development of instruments that will address the aforementioned Internet sites.

APPENDIX A

EVALUATION INSTRUMENT

WWW SITE EVALUATION - RECOMMENDATION FORM PAGE 1

SECTION A SITE NAME _____ URL _____

Fill in upon start of evaluation.

REVIEWER _____ DATE _____ START TIME _____ END TIME _____

Fill in upon completion.

SECTION B
Fill in upon completion.

REVIEWER COMMENTS:

_____
_____
_____
_____
_____
_____

RECOMMENDATION:

_____
_____
_____
_____
_____
_____
_____
_____

This site meets the criteria stated in the selection policy of this library. _____ Yes _____ No
This site is recommended as a reference source. _____ Yes _____ No

RATING TABLE

Category	Weighted Multiplier	Score	Subtotal	Scale
Multimedia Features:	2 x	_____ (1a)	= _____	27-30 Excellent
				24-26 Above Average
Content:	3 x	_____ (1b)	= _____	21-23 Average
User Interface:	1 x	_____ (1c)	= _____	18-20 Below Average
				0-17 Not Acceptable
		Total	= _____	

SIGNATURE OF REVIEWER _____ DATE _____

SECTION C
DEPARTMENT APPROVAL

SIGNATURE _____ DATE _____

PART 1 - TECHNICAL DESCRIPTION			PAGE 2
DATE OF PUBLICATION _____	DATE OF LAST REVISION _____	DATE OF SITE MOUNTING _____	

AUTHOR	HOST INSTITUTION	EDITOR/AGENT	OTHER
_____	_____	_____	_____
•Email _____	•Email _____	•Email _____	•Email _____
•Fax _____	•Fax _____	•Fax _____	•Fax _____
•Phone No. _____	•Phone No. _____	•Phone No. _____	•Phone No. _____
•Mailing Addres _____	•Mailing Address _____	•Mailing Address _____	•Mailing Address _____
•Other _____	•Other _____	•Other _____	•Other _____

GENRE _____	LANGUAGE of SITE _____	PLUG-INS REQUIRED _____
If "Other," please indicate _____		
BROWSER & LEVEL REQUIRED _____	LANGUAGE(S) OF SITE CONTENT _____	_____
_____	_____	_____
TIME TO OPEN _____	_____	APPROX NO. OF INWARD LINKS _____
SIZE (Kb) _____	COST _____	APPROX. NO. OF OUTWARD LINKS _____

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PART II - MULTIMEDIA FEATURE ANALYSIS **PAGE 3**

✓Checklist

GRAPHICS _____ Present _____ Not present (Skip to page 4)	QUESTIONS	(Check One) Y	N	NA	COMMENTS
_____ ICONS _____ INLINE ____ Black/White ____Color ____ 3D ●Classification ___ Decorative ___Representational ___Organizational ___ Explanative _____ EXTERNAL _____ Black/White ____Color ____ 3D ●Classification ___ Decorative ___ Representational ___Organizational ___ Explanative	1. Do the graphics illustrate content?				
	2. Are graphics appropriate to the information content of the site?				
	3. Are graphics placed adjacent to the content they illustrate?				
_____ DIGITIZED IMAGES _____ INLINE ____ Black/White ____Color ____ 3D ●Classification ___ Decorative ___Representational ___Organizational ___ Explanative _____ EXTERNAL _____ Black/White ____Color ____ 3D ●Classification ___ Decorative ___ Representational ___Organizational ___ Explanative	4. Are text alternatives provided for the visually impaired?				
	5. Are icons and other graphical representations used consistently throughout the site?				
	6. Do icons clearly represent that which is intended?				
_____ IMAGEMAPS _____ INLINE _____ Black/White ____Color _____ 3D ●Classification ___ Decorative ___Representational ___Organizational ___ Explanative _____ EXTERNAL _____ Black/White ____Color _____ 3D ●Classification ___ Decorative ___ Representational ___Organizational ___ Explanative	7. Is a textual description of external images provided?				
	8. Is an indication of file size offered for external images?				
	9. Are previews of graphics offered?				

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PART II - MULTIMEDIA FEATURE ANALYSIS (Contd.) PAGE 4

✓Checklist

AUDIO _____ Present _____ Not present (Skip to page 5)	QUESTIONS	(Check One) Y	N	NA	COMMENTS
_____ SYNTHESIZED SPEECH _____ INTERNAL _____ EXTERNAL ●Classification ●Classification ___Interactive Audio ___Interactive Audio ___Continuous Play ___Continuous Play	1. Is the use of audio appropriate to the site?				
	2. Does the use of audio enhance the web site?				
_____ NATURAL SOUND _____ INTERNAL _____ EXTERNAL ●Classification ●Classification ___Interactive Audio ___Interactive Audio ___Continuous Play ___Continuous Play	3. Does the use of audio benefit the visually impaired?				
	4. Are auditory icons clearly labeled?				
_____ SYNTHESIZED SOUND _____ INTERNAL _____ EXTERNAL ●Classification ●Classification ___Interactive Audio ___Interactive Audio ___Continuous Play ___Continuous Play	5. Is a textual description of external audio files offered?				
	6. Is the file size of external audio files indicated?				
_____ MUSIC _____ INTERNAL _____ EXTERNAL ●Classification ●Classification ___Interactive Audio ___Interactive Audio ___Continuous Play ___Continuous Play	7. Are excerpts of audio files provided?				

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PART II - MULTIMEDIA FEATURE ANALYSIS (Contd.) PAGE 5

✓Checklist

VIDEO _____ Present _____ Not present (Skip to Animation below)	QUESTIONS	(Check One) Y	N	NA	COMMENTS
_____ VIDEO FILE _____ INTERNAL _____ EXTERNAL ____ Black & White ____ Black & White ____ Color ____ Color ____ 3D ____ 3D	1. Is the use of video appropriate to the site?				
	2. Does the use of video enhance the web site?				
	3. Is video used to illustrate content?				
_____ VIDEO & SOUND FILE _____ INTERNAL _____ EXTERNAL ____ Black & White ____ Black & White ____ Color ____ Color ____ 3D ____ 3D	4. Does the use of video add to the clarity of information?				
	5. Is a description of external video files provided?				
	6. Is an indication of file size given for external video files?				
	7. Are preview clips offered?				
	8. Do video scenes fit in the viewing window?				
	9. Is video quality clear to the eye?				
	10. Are composite stills offered for those with no digital video capability?				
ANIMATION ___ Present ___ Not present ___ INTERNAL ____ EXTERNAL _____ Continuous _____ Continuous _____ User Activated _____ User Activated _____ 3D _____ 3D	11. Is animation used to illustrate web site content?				
	12. Is animation appropriate to the web site?				
	13. Does animation enhance the web site design?				
	14. Is animation a distraction to the user?				

MULTIMEDIA FEATURE RATING (Circle One) 1 2 3 4 5

(Transfer Rating to Page 1, Line 1a)

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PART III - CONTENT ANALYSIS & EVALUATION SCOPE	(Check One)			PAGE 6
PURPOSE	**Y**	**N**	**NA**	**COMMENTS**
1. Is there a statement of purpose?				If "yes," what is the purpose?
2. Does the resource fulfill the intended purpose?				If "no," what is the implied purpose?
INTENDED AUDIENCE				
1. Who is the intended audience of this web site? ___Adult Consumer ___Professional Business Person ___Technical Expert ___Professor ___Scientist ____Researcher ____All ___Other				If "other," please explain.
2. What is the educational level of the intended user of this site? ___Secondary ___Collegiate ___Graduate ___Doctoral ____All ___Other				If "other," please explain.
3. Is the terminology used familiar to the intended audience?				
4. Will the web site satisfy the needs of its intended audience?				
5. Does the library's user group correspond to the intended audience?				
COVERAGE				
1. What subject areas are covered by this web site?				Explain.
2. Is information limited to a certain time period?				Please Comment.
3. Is coverage national in scope?				
4. Is coverage international in scope?				
5. Is coverage of the subject matter exhaustive?				If "no," please explain.
6. Is coverage of the subject matter comprehensive?				If "no," please explain.
7. Does actual coverage coincide with the intended mission?				
CURRENCY				
1. Is the site updated on a regular basis?				
2. Are dates of the updates provided?				
3. Does it appear that there is an ongoing commitment to maintain the site?				

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PART III - CONTENT ANALYSIS & EVALUATION (Contd.)	(Check One)			PAGE 7
AUTHORITY	**Y**	**N**	**NA**	**COMMENTS**
•AUTHOR OF WEB SITE				
1. Is the name of the author given?				
2. Is contact information for the author provided?				
3. Are the credentials of the author stated?				
4. Was the information prepared as part of the author's professional duties within his or her area of expertise?				
5. Is the author affiliated with the host institution or producer of the site?				
6. Has the author created any other web sites?				
•PRODUCER				
1. Is the name of the producer/host institution given?				
2. Is there an official name or logo of the producer present at the site?				
3. Is contact information for the producer given?				
4. Is it suitable for this organization to publish information on this topic?				
5. Has the organization produced other web sites?				
ACCURACY OF DOCUMENT LINGUISTICS				
1. Does the site have an editor?				
2. Is the site free of misspellings?				
3. Are acronyms, abbreviations, and other alphanumeric information comprehendible?				
4. Are acronyms, abbreviations, and other alphanumeric information used consistently?				

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PART III - CONTENT ANALYSIS & EVALUATION (Contd.)	(Check One)			PAGE 8
ACCURACY OF INTELLECTUAL CONTENT	**Y**	**N**	**NA**	**COMMENTS**
1. Does the information presented as fact correspond to known facts?				
2. Are sources of information cited?				
3. Are related sources accessible via links?				
4. Is an explanation of methodology provided, if applicable?				
5. Is the Internet medium appropriate to the content?				
OBJECTIVITY				
1. Does the web site reside on a server of an organization having political, philosophical, commercial, or other agenda?				If "yes," please explain.
2. Are all viewpoints on the subject presented?				
3. Is there evidence of bias?				
ORGANIZATION				
•ARRANGEMENT				
1. Is the content organized according to a principle of arrangement, e.g., alphabetical, numerical, chronological, geographical?				If "other," please explain.
2. Is the principle of arrangement obvious to the user?				
3. Is the principle of arrangement subdivided by an element of arrangement, e.g., by author, title, subject?				If "other," please explain.
4. Is the element of arrangement obvious to the user?				
5 Is the organizational scheme appropriate to the resource?				
6. Is a Table of Contents or Site Map present at the site's homepage?				
7. Does the organizational scheme facilitate navigation of the web site?				
8. Is there evidence of misplaced information within the site?				

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PART III - CONTENT ANALYSIS & EVALUATION (Contd.)	(Check One)			PAGE 9
ARRANGEMENT (Contd.)	**Y**	**N**	**NA**	**COMMENTS**
•LINKS				
1. Are links clearly distinguished by a formatting feature, e.g. , bold face, color?				
2. Is the arrangement of links uncluttered?				
3. Are internal links reliable?				
4. Do internal links facilitate navigation?				
5. Are external links reliable?				
6. Are external links up to date?				
7. Are external links appropriate to the source?				
8. Is the standard link color, blue, used consistently throughout the site to indicate links to pages not yet selected by the viewer?				
9. Are the standard link colors, purple or red, used consistently throughout the site to indicate links to pages previously selected by the viewer?				
RELATION TO OTHER WORKS				
1. Is the information in this resource available in other formats?				
2. If the site is derived from another format, does it have all the features of the original?				
3. Have features been added?				
4. Does the web site complement another resource in any way?				If "yes," please explain
5. Is the presentation of information unique?				

CONTENT RATING (Circle One) 1 2 3 4 5

(Transfer Rating to Page 1, Line 1b)

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PART IV - USER INTERFACE EVALUATION	(Check one)			PAGE 10
NAVIGATION	**Y**	**N**	**NA**	**COMMENTS**
1. Is content accessible in 3 mouse clicks or less?				
2. Are the navigational aids present at the top and/or bottom of the pages?				
3. Are navigational aids clearly labeled?				
4. Are pages linked back to the homepage?				
5. Does the use of frames restrict ease of navigation?				
SEARCHING				**COMMENTS**
1. Is a search feature or search engine present? (If "no," do not answer 2-6)				
2. Does the search engine index the entire resource?				
3. What type of searching is available at the site? Indicate Below. __ Keyword __ Exact Match __ Weighted __ Other				If "other," please explain
4. Are search features available? (If "yes," indicate below.) __ Boolean Operators __ Truncation __ Adjacency Operators __ Other				If "other," please explain
5. Is the format display of search results understandable?				
6. Can the user manipulate search results?				
7. Does the search facility have a "Help" feature?				
VISUAL CLARITY				**COMMENTS**
1. Are types of information, e.g., text, symbols, graphics, etc. clearly distinguished from each other?				
2. Does important information stand out on the screens?				
3. Is it clear where the user enters information on the screens?				
4. Is it clear in what format information is to be entered?				
5. Are light colors displayed on a dark background?				
6. Are dark colors displayed on a light background?				
7. Does the use of certain colors discourage viewing over long time periods?				

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PART IV - USER INTERFACE EVALUATION (Contd.)				PAGE 11
INFORMATIVE FEEDBACK AND SUPPORT	**Y**	**N**	**NA**	**COMMENTS**
1. Do instructions and prompts clearly indicate what to do?				
2. Are instructions consistently worded throughout the site?				
3. Are status messages present to indicate what the system is doing or has done?				
4. Does the system inform the user if errors occur?				
5. Does the system allow the user to correct errors?				
6. Is it made clear to the user how to correct errors?				
7. Does the site contain large print to aid those with visual disabilities?				
8. Does the site contain an FAQ section?				
9. Is a "Help" feature present?				
10. Is it clear how to access and exit the help facility?				
11. When using the "Help" feature, does the system explain actions in the context of what the user is currently doing?				
12. When using "Help," can the user find information efficiently, avoiding unnecessary information?				

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USER INTERFACE RATING (Circle One) 1 2 3 4 5

(Transfer Rating to Page 1, Line 1c)

APPENDIX B

USER'S GUIDE

This instrument has been developed to meet the adult reference librarians's current, critical need for a comprehensive World Wide Web site evaluation and reviewing tool. The accompanying User's Guide provides important information and guidance for supervisors overseeing the evaluation process and for evaluators and reviewers themselves. Topics addressed in the User's Guide include: instruction for proper usage, definition of terms, and integration of the instrument into the selection process.

Experienced Internet librarians, as well as new reference librarians, will find this evaluation instrument effective and easy to use in identifying quality web sites (search engines and catalogs not included). The instrument addresses content and design elements using the methods of feature analysis and content analysis. Evaluation criteria are presented in the form of checklists and questionnaires which enable the reviewer to complete the forms in a systematic, methodical manner. A tickmark system, indicating the presence or absence of these criteria, is the means by which evidence is gathered for the justification stage of the final decision-making process.

The instrument is composed of four main parts and is to be implemented in the following order: Part I - Technical Description; Part II - Multimedia Feature Analysis; Part III - Content Analysis; and Part IV - User Interface Evaluation. The average amount of time

required to complete a review session is 37 minutes. This time frame will vary depending upon various factors such as the complexity and detail of the web site. It is advisable to conduct a complete evaluation in one session in order to gain a more thorough understanding of the site. Before beginning Part I, evaluators should direct their attention to Page 1, the Cover Sheet or "Recommendation Form." Instructions for completing this form and the four major parts of the evaluation instrument are included in the pages that follow.

RECOMMENDATION FORM

Page One of the instrument, the "Recommendation Form," serves the dual purpose of compilation sheet and approval form. Important descriptive and quantitative data, to be recorded in sections A, B, and C will provide reference librarians and department supervisors with an overview of the Internet site. Section A, to be filled in at the onset of a review session, includes a place for the reviewer's name, date, start time, and end time. Section B contains the rating table and a place for commentary regarding the approval or rejection of the web site as a reference source. The rating table allows the reviewer to assign numerical value to a site. Its purpose is best served when comparing and selecting sites similar in purpose and scope. Upon completing Parts II, III, and IV, the reviewer assigns a rating from one to five based on the scale below and transfers the number to the respective lines, 1a, 1b, or 1c, of Page One.

5 - **Excellent.** The site contains all of the features and meets all of the criteria exemplifying superior quality.

4 - **Above Average.** The site contains almost all of the features and meets almost all of the criteria exemplifying above average quality.

3 - **Average.** The site contains enough features and meets a sufficient number of criteria that it is considered satisfactory.

2 - **Below Average.** The site contains an insufficient number of features and does not meet enough of the criteria to be considered satisfactory.

1 - **Failing.** The site is not worth considering for this library.

The rating system employs the weighted multipliers 1, 2, and 3. As in the evaluation of any reference source, content is the primary consideration and is, therefore, weighted by the multiplier 3. The second most important feature, the use of multimedia, is critical to the conveyance of content and is weighted by the multiplier 2. The third most important area, User-Interface Design, is assigned the multiplier 1. If this rating system does not meet the needs of a library, it can be deleted from the review process entirely or tailored to a specific situation.

The final decision regarding the acceptance or rejection of a web site as a reference source should be made by weighing the quantitative and qualitative results of the evaluation against those criteria stated in the library's selection policy. Once the evaluator has indicated his conclusion in Section B, the complete set of forms should be submitted to the head of reference or a supervisor for official approval. (See Section C) It is suggested that the department head retain the originals and return a copy to the reference department. All reviews should be placed together in a file or binder designated "Web Site Reviews " and kept on hand at the main reference desk. The purpose of this collection is not only to serve as a handy ready reference tool for librarians, but also to serve as an official log of the library's own "bookmarked" Internet sites.

Finally, libraries should strongly consider incorporating this web site evaluation instrument into their selection policy. World Wide Web sites must be treated as would any other media. Questions regarding this issue that need to addressed include: Who is responsible for conducting reviews? How often will reviews be conducted? How many sites

does the library intend to review? From what sources will the library choose potential Internet sites? and How often will sites be reevaluated and / or deselected? - a key issue given the highly fluid state of the Internet.

These basic questions comprise the fundamental principles of an Internet Collection Development Policy upon which librarians will want to expand. Whether this means developing a separate policy, or revising and updating an existing one, this action is an essential step in the Selection and Acquisition Process.

PART I - TECHNICAL DESCRIPTION

Part I, the Technical Description, is a fill-in form which serves as a recording device for descriptive data. For the most part, this information can be located on the home page of a web site. Definitions, along with a brief explanation of the terms appearing in Part I, are listed below in alphabetical order.

Approximate No. Of Inward Links - An estimate of the number of links leading to various types of files such as audio, video, graphics, text, etc., within the site.

Approximate No. Of Outward Links - An estimate of the number of links leading to various types of files such as audio, video, graphics, text, etc., outside the site.

Author - Person(s) responsible for the intellectual content of the web site, usually indicated in the footer area of the home page.

Browser Type and Level Required - Type of web browser and version number required to display the web site. Examples include: Internet Explorer, Netscape Navigator, and Spyglass Mosaic.

Cost - Free or fee-based.

Date of Last Revision - When the site was last changed or revised, usually indicated at the bottom of the home page, or sometimes at the bottom of every page.

Date of Publication - The date the intellectual content was originally published, usually found at the bottom of the home page, or sometimes at the bottom of each individual page.

Date of Site Mounting - When the information was placed on the Internet,

usually indicated on the footer of the home page.

Editor / Agent - Person(s) who have made other significant contributions to the intellectual content of the work.

Genre - Type of Source. Select from the list below, or indicate "other" on the line provided and explain.

Academic Institution home pages
Advertising Site for a Product
City Site
Collection of Links focused on a special subject or theme
Comedic Pages
Company Web Site
Directory (phone, map, etc.,)
Electronic Journal or Magazine
Federal Government Pages
News Source(s)
Organization and / or Association Pages
Personal Site
University-based Project

Host Institution - Agency responsible for making the object available. Examples are: company, government, university, etc., usually indicated in the header or footer areas.

Site Name - Official title of site, usually found on the header of the home page.

URL - Uniform Resource Locator, the unique address of the web site.

Language(s) of Site - Primary language(s) such as English, French, Spanish, etc., used at the site.

Language(s) of Site Content - Language(s) of the intellectual content of the site.

Other - Any other person acknowledged at the site for having made an intellectual contribution to the work.

Plug-Ins Required - Hardware or software modules that enable browsers to display specific audio or video features, usually indicated on the home page.

PART II - MULTIMEDIA FEATURE ANALYSIS

The complex interactive environment of the Internet hosts a variety of media through which information is communicated. In Part III, Multimedia Feature Analysis, the evaluator is required to maneuver throughout the site to determine the presence or absence of specific elements such as: graphics, audio, video, and animation. The use of criteria checklists and sets of questions will aid the evaluator in determining whether the multimedia design enhances or distracts from the content. The terms appearing in Part II are defined and explained below in alphabetical order.

Animation - Movement created by displaying a series of pictures or frames.

Continuous Play - Nonstop, continual from the onset of initialization.

Decorative - Providing visual appeal and emphasis.

Digitized Image - A graphic or image that has been manipulated with a computer. The purpose of the image may be representational, organizational, explanative, or decorative. The image may appear in black and white or color.

Explanative - Showing how processes work.

External - Outside the web site.

Icon - A graphical representation of an object or program. Icons can be classified as decorative, representational, organizational, or explanative. Web sites may contain all types of icons, some types of icons, or none at all. They may appear in color or black and white.

Imagemap - A clickable image that contains a link to a different location

either within the web site or outside the web site. The surrounding area on which the user clicks is termed the "hot spot." Imagemaps may appear in black and white or color and be classified as decorative, representational, organizational, or explanative.

Inline - Internal to the web site.

Interactive Audio - Sound generated by the user, usually produced by clicking on an icon.

Music - Vocal or instrumental sounds having rhythm, melody, and harmony.

Natural Sound - Sounds taken from nature.

Organizational - Depicting relationships among items mentioned in the text.

Representational - Containing items mentioned in the text.

Synthesized Sound - Computer generated sounds that are neither produced by humans nor taken from nature.

Synthesized Speech - Human speech generated by a computer.

User-activated Animation - Motion that is initialized by the user, usually by clicking on an icon.

Video - Visual portion of a movie clip or film that is prepared for viewing on a computer monitor.

Video File - Video and audio combined.

PART III - CONTENT ANALYSIS AND EVALUATION

Having made an initial appraisal of the web site by recording the technical data and examining the multimedia features, the evaluator should now be prepared to analyze the intellectual content of the site. Content is the primary consideration in evaluating any reference source. The numerous elements of content are quite complex and require considerable deliberation on the part of the evaluator. The elements appearing in Part III are defined and described below in alphabetical order.

Accuracy of Intellectual Content - The information presented at the web site corresponds to known facts. Check for the presence of a bibliography or links to sources cited in the text. Look for names of individuals or sources from which nonpublished data was obtained. For a research site, check for an explanation of research methods.

Accuracy of Document (Linguistics) - Correct spelling of words, acronyms, and abbreviations, proper syntax, proper semantics, correct usage of alphanumeric information. Consult Prentice Hall Handbook for Writers or a similar reference source to verify accuracy.

Authority - Characteristics pertaining to the quality of a site. Determine whether the site has a reputable organization or expert behind it. Look for standardized names. Check headers and footers to see who is producing or sponsoring the site. The URL may provide clues as to the authority of the source. For example, a tilde "~" usually indicates a personal web directory. Other indicators may be the following URL domains:

".edu" - domain of a server representing an education institution
".gov" - domain of a server representing a government
".com" - domain of a server representing a commercial business
".net" - domain of a server representing a network

".org" - domain of a server representing an organization

Note that authority may or may not be related to the author or sponsoring agency.

Coverage - Subject areas presented, time periods covered, geographic areas covered. Coverage may be evaluated in detail by comparing the web site to other sources, such as print sources on the same topic.

Currency - Timeliness of information. A web site may be static or updated regularly. Consult the home page or end page for a statement regarding currency.

Intended Audience - The users at whom the web site is directed. Check for a description of the intended audience in the mission statement or introduction. Language and writing style may also provide clues as to the intended audience.

Links - An element in an electronic document that connects to another place in the same document (inward link) or to an entirely different document (outward link), also referred to as a hyperlink. Links should serve as screening and pointing instruments for users. Links greatly affect the logical layout of a web site and should be thoroughly evaluated during the review process.

Objectivity - The use of balance in the presentation of controversial issues. Determine whether the information is fact, opinion, or propaganda. Check for the presence of emotion-rousing words and bias. Examine the URL for clues as to the origin of the site.

Organization - Arrangement, structure of a web site. Sites may be arranged according to traditional schemes such as: alphabetical, numerical, chronological, or geographical, or according to an organizational structure such as academic departments or corporate hierarchy, by subject categories, or by some other organizational scheme. How well a web site is arranged will impact how easy it is to use.

Purpose - Mission Statement. Look for this statement on the home page. Some sites may or may not contain a mission statement. If they do not, their purpose may be implied.

Relation to other Works - Compatibility to other works. Examine other sites, as well as print counterparts, similar in scope and purpose. Determine

PART IV - USER INTERFACE EVALUATION

User-Interface Design is the area in which criteria for Internet sources differ most from other sources, particularly print sources. Never before has there existed such an intensely interactive multimedia medium. Issues critical to this area are: Navigation; Visual Clarity; Searching; and Informative Feedback and Support. A complete understanding of the importance of these elements, along with their rigorous evaluation and review, are essential in assessing the quality of a web site. A reference source in which information is poorly indexed and organized is seldom used; whereas, a reference source in which information is easy to find and readily available is consulted frequently and considered a superior tool. Definitions of the terms found in Part IV are listed below.

Informative Feedback - Information that informs the user what has been done or is to be done. Due to the highly interactive medium of the World Wide Web, it is crucial to examine this type of feedback and its value at the web site.

Navigation - Maneuverability within a web site. Navigational ease is critical in obtaining information at a site. Devices should be present at the top and / or bottom of each page, regardless of the web site size or complexity.

Search Facility - A program that allows the user to query the site. Some sites will have search facilities and some will not. Performing several trial searches will help to determine the engine's capabilities.

Visual Clarity - The clearness by which symbols indicate their functions and relationships.

ENDNOTES

1. Robert Farmighetti, ed., The World Almanac and Book of Facts 1997. (Mahwah: K-III Reference Corporation, 1997), p. 567.

2. James Rettig, Putting the Squeeze on the Information Firehose: The Need for Neteditors and Netreviewers [article on-line]; available from http://www.swem.wm.edu/firehose.htm; Internet; accessed 29 April 1997.

3. Louis B. Rosenfeld, "Guides, Clearinghouses, and Value-Added Repackaging: Some Thoughts on How Librarians Can Improve the Internet," References Services Review. Winter, (1994): 11-15.

4. Matthew Ciolek, The Six Quests for the Electronic Grail: Current Approaches to Information Quality in WWW Resources [article on-line] available from http://coombs.anu.edu.au/SpecialProj/QLTY/TMC/Quest1.html; Internet; accessed 16 April 1997.

WORKS CITED

Alexander, Jan and Marsha Tate. "Review of the Five Traditional Print Evaluation Criteria," available from http://weber.u.washington.edu/libr560NETEVAL/criteria.html; Internet. 21 February 1997.

Auer, Nicole, "Bibliography on Evaluating Internet Resources" 1997, available from http://refserver.lib.vt.edu/libinst/critTHINK.HTM; Internet. 14 April 1997.

Bopp, Richard., and Linda C. Smith. Reference and Information Services. Englewood, C.O.: Libraries Unlimited, Inc. 1991.

Brandt, Scott. "Evaluating Information on the Internet," 1996, available from http://www.infotoday.com/cilmag/may/techmans.htm; Internet. 22 February 1997.

Caywood, Carolyn. "Library Selection Criteria for WWW Resources," 1995, available from http://duckdock.acic.com/carolyn/criteria.htm; Internet. 22 February 1997.

Ciolek, Matthew. "The Six Quests for the Electronic Grail: Current Approaches to Information Quality in WWW Resources," 1996, available from http://coombs.anu.edu.au/SpecialProj/QLTY/TMC/Quest1.html; Internet. 16 April 1997.

Collins, Boyd. "Beyond Cruising: Reviewing." Library Journal. 121 (February 15, 1996): pp. 9-19.

December, John, and Neil Randall. World Wide Web Unleashed 1996. Indianapolis, I.N.: Sams.net. 1996.

Dix, Alan, Janet Finlay, Gregory Abowd, and Russell Beale. Human-Computer Interaction. New York: Prentice Hall, 1993.

Farmighetti, Robert, ed. The World Almanac and Book of Facts 1997. Mahwah: K-III Reference Corporation, 1997.

Garlock, Kristen, and Sherry Piontek. Building the Service-Based Library Web Site: A Step-by-Step Guide to Design and Options. Chicago: ALA Association. 1996.

Grassian, Ester. "Thinking Critically about World Wide Web Resources." 1997, available from http://www.library.ucla.edu/libraries/college/instruct/critical.htm; Internet. 22 February 1997.

Janicke Hinchliffe, Lisa. "Resources Selection and Information Evaluation." 1995, available from http://alexia.lis.uiuc.edu/~janicke/Evaluate. html; Internet. 17 April 1997.

Jones, Debra. "Critical Thinking in an Online World." 1996, available from http://library.ucsb.edu/untangle/jones/htm1; Internet. 19 April 1997.

Kinder, Robin. ed. Librarians on the Internet. New York: The Hayworth Press, Inc. 1994.

Kirk, Elizabeth E. "Evaluating Information Found on the Internet." 1996, available from http://milton.mse.jhu.edu:8001/research/education/net.htm; Internet. 22 February 1997.

Kobler, Ronald D. ed. PC Novice Guide to Web Sites. Lincoln: Sandhills Publishing, 1997.

Krol, Ed. The Whole Internet. Sebastopol: O'Reilly & Associates, Inc., 1996.

Mayhew, Deborah J. Principles and Guidelines in Software User Interface Design. Englewood Cliffs: Prentice Hall, 1992.

Nielsen, Jacob. "Top Ten Mistakes in Web Design" 1996, available from http://www.useit.com/alertbox/9605htm1; Internet. 22 April 1997.

Rettig, James. "Beyond 'Cool': Analog Models for Reviewing Digital Resources." Online. 20 (5) Sept./Oct. 1996, 52-64.

Rettig, James. "Putting the Squeeze on the Information Firehose: The Need for Neteditors and Netreviewers." 1995, available from http://www.swem.wm.edu/ firehose.htm; Internet. 15 April 1997.

Rosenfeld, Louis B. "Guides, Clearinghouses, and Value-Added Repackaging: Some Thoughts on How Librarians Can Improve the Internet." References Services Review. Winter, 1994, 11-15.

Santa Vicca, Edmund F. "The Internet as a Reference Tool:" A Model for Educators," 41/42, 1994, 225-236.

Smith, Alistair. "Criteria for Evaluation of Internet Information Resources." 1996, available from http://www.vuw.ac.nz/~agsmith/evaln/index.htm; Internet. 19 April 1997.

Smith, Darren L. ed. Web Site Source Book. Detroit: Omnigraphics, Inc. 1996.

Stevens, Norm. "Evaluating Reference Books in Theory and Practice." Reference Librarian. No. 15 (1986): pp. 9-19.

Tillman, Hope N. "Evaluating Quality on the Net," 1996, available from http://www.tiac.net/users/hope/findqual.htm1; Internet. 22 February 1997.

Wilson, Stephen. World Wide Web Design Guide. Indianapolis: Hayden Books, 1995.